

## CLAIMS

What is claimed is:

1        1.        A method of  
2                embedding a watermark in a data set,  
3                processing the data using some parameter set,  
4                determining presence of data corruption of the data set with respect to an original data set  
5        by measuring the amount of a recovered watermark, and  
6                adjusting the parameter set for the data processing based on the presence of data  
7        corruption.

1        2.        The method of claim 1, further comprising processing the data set by transform encoding  
2        the data set.

1        3.        The method of claim 1, further comprising processing the data set by packetizing and  
2        transmitting the data set.

1        4.        The method of claim 1, further comprising identifying image frame errors in packet  
2        transmitted audiovisual data sets.

1        5.        The method of claim 1, wherein adjusting the parameter set further comprises modifying  
2        network bandwidth to compensate for data corruption of the data set.

1        6.        The method of claim 1, wherein determining presence of data corruption further  
2        comprises quantitatively measuring spatial extent of corruption of image data sets.

1        7.        The method of claim 1, wherein determining presence of data corruption further  
2        comprises quantitatively measuring temporal duration of corruption of data sets.

1        8.        An article comprising a computer readable medium to store computer executable  
2        instructions, the instructions defined to cause a computer to

3 embed a watermark in a data set,  
4 process the data using some parameter set,  
5 determine presence of data corruption in the data set with respect to an original data set  
6 by measuring the amount of a recovered watermark, and  
7 adjust the parameter set for the data processing based on the presence of data corruption.

1 9. The article comprising a computer readable medium to store computer executable  
2 instructions of claim 8, wherein the instructions further cause a computer to process the data set  
3 by transform encoding the data set.

1 10. The article comprising a computer readable medium to store computer executable  
2 instructions of claim 8, wherein the instructions further cause a computer to process the data set  
3 by packetizing and transmitting the data set.

1 11. The article comprising a computer readable medium to store computer executable  
2 instructions of claim 8, wherein the instructions further cause a computer to identify image frame  
3 errors in packet transmitted audiovisual data sets.

1 12. The article comprising a computer readable medium to store computer executable  
2 instructions of claim 8, wherein the instructions further cause a computer to adjust the parameter  
3 set by modifying network bandwidth to compensate for data corruption of the data set.

1 13. The article comprising a computer readable medium to store computer executable  
2 instructions of claim 8, wherein the instructions further cause a computer to determine presence  
3 of data corruption by quantitatively measuring spatial extent of corruption of image data sets.

1 14. The article comprising a computer readable medium to store computer executable  
2 instructions of claim 8, wherein the instructions further cause a computer to determine presence  
3 of data corruption by quantitatively measuring temporal duration of corruption of data sets.

- 1 15. A data degradation measurement system comprising  
2 a watermarking module to embed a recoverable watermark in a data set,  
3 a processing module for modifying the data using some parameter set, and  
4 a watermark recovery module to determine presence of data corruption of the data set  
5 with respect to an original data set by measuring the amount of a recovered watermark.
- 1 16. The method of claim 15, wherein the processing module further comprises a transform  
2 encoding processor to process the data set by transform encoding the data set.
- 1 17. The method of claim 15, wherein the processing module further comprises a packetizer to  
2 process the data set by packetizing and transmit the data set.
- 1 18. The method of claim 15, wherein the watermark recovery module further detects image  
2 frame errors in packet transmitted audiovisual data sets.
- 1 19. The method of claim 15, wherein the processing module adjusts the parameter set by  
2 modifying network bandwidth to compensate for data corruption of the data set.
- 1 20. The method of claim 15, wherein the watermark recovery module quantitatively measures  
2 spatial extent of corruption of image data sets.
- 1 21. The method of claim 15, wherein the watermark recovery module quantitatively measures  
2 temporal duration of corruption of data sets.
- 1 22. The method of claim 15, further comprising a back channel transmitter to communicate  
2 information to the processing module to adjust the parameter set for the data processing based on  
3 the presence of data corruption detected by the watermark recovery module.
- 1 23. A method of  
2 receiving an embedded watermark in a data set,

3           determining quality of the received data set with respect to an original data set by  
4   measuring the amount of a recovered watermark, and  
5           adjusting determined billing value of the received data set based on the determined  
6   quality.

1   24.    The method of claim 23, wherein adjusted billing value is partitioned between a content  
2   provider and a service provider.

1   25.    The method of claim 23, wherein the data set is provided by a content encoder, and  
2   wherein the determined quality of the received data set is transmitted to the content encoder to  
3   permit encoding adjustments.

1   26.    The method of claim 23, wherein the data set is transmitted by a service provider, and  
2   wherein the determined quality of the received data set is transmitted to the service provider to  
3   permit quality of service adjustments.

1   27.    The method of claim 23, wherein the determined quality of the received data set is used to  
2   drop data frames from playback having less than a predetermined quality level.

1   28.    A method of  
2           embedding a watermark in a data set to allow reception-side determination of quality of  
3   the data set with respect to an original data set by measuring the amount of a recovered  
4   watermark,  
5           transmitting the data set having the embedded watermark, and  
6           accepting information about determined quality of the transmitted data set and adjusting  
7   at least one of a data encoding parameter or transmission parameter in response for later  
8   transmitted data.

1   29.    A method of  
2           embedding a watermark in an original data set,

3 transmitting the data set having the embedded watermark over a packet based network to  
4 a receiver,  
5 determining quality of the received data set with respect to the original data set by  
6 measuring the amount of a recovered watermark, and  
7 adjusting determined billing value of the received data set based on the determined  
8 quality with respect to the original data set.